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DECLARATION OF Dr. MARCUS ETTL

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of

Feng Cheng et al.

Serial No. 09/551,118 Group Art Unit 3627

Filed April 17, 2000 Examiner R. Laneau

For LARGE INVENTORY-SERVICE OPTIMIZATION IN CONFIGURE-TO-ORDER SYSTEMS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION UNDER 37 C.F.R. §1.132
OF
Dr. MARCUS ETTL

Sir:

MARCUS ETTL declares as follows:

1. I am a Research Staff Member at IBM's T.J. Watson Research Center. I am working in the Supply Chain Analytics and Architecture Department, which researches and develops optimum structures and policies to manage enterprise supply chains. I joined IBM Research in 1995 after receiving a doctoral degree in Computer Science (1995) and an M.S. in Computer Science (1990) from Friedrich-Alexander University in Erlangen, Germany.

2. Since joining IBM, I have been primarily focused on advanced research in supply chain management. I conducted research in constrained multi-echelon inventory optimization for large-scale supply networks, using integrated nonlinear programming with gradient search, heuristic clustering, and queuing analysis. I have conducted supply chain modeling and analysis projects for a variety of clients. I was a member of the IBM research team that developed

the IBM Supply Chain Analyzer, a consulting tool that was used both inside and outside of IBM for strategic analysis of supply chain issues. My most recent research interest is in Sense-and-Respond systems for adaptive organizations. My other research activities include business process modeling, simulation, and design of decision support systems for manufacturing logistics.

3. I have published 17 journal articles and filed three patents. I have made numerous customer presentations and presentations upon invitation at universities, plenaries, and international conferences. My awards and commendations include an IBM Outstanding Technical Achievement Award, and several IBM Research Division Awards for inventions and technical accomplishments. I am co-author of IBM's work on extended-enterprise supply chain management, which was awarded the INFORMS Franz Edelman Award in 1999. I am a member of INFORMS and IEEE.

4. I am a co-inventor of the subject patent application. I have reviewed the application, including the claims, and the examiner's remarks as contained in the office actions mailed on 3/11/2003, 7/18/2003, 10/21/2003, 12/29/2003, 7/13/2004, and 10/19/2004, and as expressed in an interview on March 31, 2004. I have also reviewed the references in this case, namely, U.S. Patent No. 6,516,301 to Aykin and U.S. Patent No. 5,963,919 to Brinkley et al. ("Brinkley").

5. In regard to the Examiner's statement that "If inventory is optimized to meet customer need, then it is inherent that inventory costs are also optimized, because there will be no excess inventory, and hence no excess inventory costs" we have shown that Aykin's method fails to provide cost-optimal inventory policies when component costs are not identical.

6. A numerical example is helpful to illustrate this point. Based on the PC case study referred to in the application (beginning at page 26, line 23), we compared the results from Aykin's method to the method of the invention. To get

a fair comparison we calibrated both models such that the customer service levels came out to 91% off-the-shelf availability. The attached table shows the safety factors, inventory in units, and inventory costs for both methods.

7. In summary, the method of the invention results in $1.49M total inventory costs whereas Aykin's method results in $1.61M total inventory costs. This is a cost different of 8%, which is significant in view of the high risk of inventory obsolescence and existing margins of about 10% in the PC business.

8. The main contribution of the Brinkley patent is a method for a) evaluating and classifying products based on characteristics like historical order volume, historical demand volatility, stable demand vs. rare demand, replenishment setup costs, holding costs etc., b) recommending one of six generic inventory management strategies for each product based on how the product is classified, and c) calculating operational parameters necessary to implement the recommended inventory strategy.

9. The Examiner asserts that there is "no difference between Brinkley's disclosure and the claimed invention." This is incorrect. The claimed invention optimizes inventory management based on cost differences between components. Brinkley gives no consideration to cost differences between components. What Brinkley does do is provide a mechanism for selecting an appropriate inventory management strategy for each item in an inventory portfolio. Brinkley describes six generic inventory management strategies. However, of these six strategies, only two are relevant to the claimed invention, and their relevance is limited as described below.

10. The two inventory management strategies disclosed in Brinkley where product costs are used are the calculations of economic order quantities for strategies 3 and 5 (in the EOQ formula on col. 13.) Our invention determines cost-optimal safety stock levels in a CTO assembly system with multiple products and multiple components. It analyzes multiple components in a joint optimization

model, and explicitly models the interdependencies of component inventories and their effect on customer serviceability. The EOQ formula for a single product scenario is unrelated to the problem we're trying to solve because it does not capture interdependencies introduced through bills-of-materials. It can not be combined with or extended to an assembly-type model such as Aykin's or ours.

11. Brinkley's method is potentially applicable to managing warehouse inventories in a retail and distribution environment, but not to high-technology manufacturing-assembly supply chains. Brinkley does not consider, nor can it be extended to, multi-level supply chains with multiple products, common components, bills-of-materials, assemble-to-order or configure-to-order operations. All operational parameters listed on cols. 12-14 of Brinkley are calculated from standard equations for single-item, single-echelon inventory systems and can be found in any textbook on operations management. The inventory management strategies described by Brinkley are also standard, including make-to-plan (here called "fixed-rate-supply"), make-to-order and make-to-forecast.

12. **I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the above referenced application and any patent issuing thereon.**

Date: 11/10/04

Dr. MARCUS ETTL

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NOV 19 2004
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		91%				91%			
31	$ 705		1.71	549	$ 386,982		2.33	748	$ 527,29
32	$ 36		2.97	965	$ 34,846		2.33	757	$ 27,33
33	$ 267		2.01	101	$ 26,821		2.25	113	$ 30,02
34	$ 468		2.01	201	$ 94,092		2.25	225	$ 105,32
35	$ 344		2.1	632	$ 217,284		2.36	710	$ 244,18
36	$ 695		1.37	69	$ 47,608		1.53	77	$ 53,16
37	$ 99		2.6	845	$ 83,655		2.33	757	$ 74,96
38	$ 99		2.6	835	$ 82,625		2.33	748	$ 74,04
39	$ 99		3.01	301	$ 29,799		2.78	278	$ 27,52
310	$ 99		2.6	845	$ 83,655		2.33	757	$ 74,96
311	$ 135		2.5	280	$ 37,800		2.2	246	$ 33,26
312	$ 172		2.41	725	$ 124,771		2.36	710	$ 122,18
313	$ 37		3.35	335	$ 12,395		2.78	278	$ 10,28
314	$ 99		2.6	835	$ 82,625		2.33	748	$ 74,04
315	$ 99		3.01	301	$ 29,799		2.78	278	$ 27,52
316	$ 99		2.7	678	$ 67,092		2.44	612	$ 60,63
317	$ 99		2.49	500	$ 49,549		2.16	434	$ 42,98
otal				**8,996**	**$ 1,491,398**			**8,477**	**$ 1,609,74**

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